

Use of natural organic acid “Apple Vinegar” as a method of biological health control

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Various stressors factor such as changing diet, transport, diseases influence the balance of natural microbial flora in the gastrointestinal tract. Under these conditions, the use of antibiotics is inevitable in order to control or eliminate harmful microorganisms. Continuous and long-term use of antibiotics to prevent or control disease in livestock and poultry feed may lead to the presence of these compounds in the products (1,2). Since 1997, the World Health Organization (WHO) and the Food and Agriculture Organization (FAO) have paid much attention to the potential risks of the addition of antibiotics stimulating growth to livestock and poultry diets and finally the use of growth-promoting antibiotics in Europe was banned in 2006 (3).

The short chain fatty acids (SCFA) are considered as the potential alternative to antibiotic growth promoter (4). Acetic acid is one such SCFA, which has higher bactericidal activity when the acid is undissociated. The bacterial cell takes up undissociated fatty acid, which, by ionizing fatty acid inside the bacterial cell, there is a change in the intracellular pH leading to the death of bacterial (5). Organic acids added to feed for their various beneficial effects on gut function and micro flora, feed preservation from microbial invasion, inhibition of pathogenic bacteria, enhancing mineral absorption, and improvement of nutrient digestibility (6).

Acetic acid also appears to play a role in the development of the intestinal epithelium. It is reported that acetate derived from the fermentation of

non-starch polysaccharides is considered to be important for normal development of epithelial cells (7). Adding organic acids to food or drinking water reduces the pH of the digestive system, the accumulation of pathogens in the intestinal wall, stimulates the development of beneficial intestinal microbial flora (8), helping to overcome the beneficial bacterial population to pathogenic bacteria and the reduction of toxic metabolites that produced by harmful bacteria (9).

Apple vinegar is one of the apple products that contain various types of flavonoids including quercetin, camproforol, catechins, apicotin, anthocyanin, cyanidin-3-glucoside and organic acids such as acetic acid and malic acid. Apple vinegar has antibiotic, antibacterial and antifungal properties. Beta-carotene available in apple vinegar has antioxidant properties. Consumption apple vinegar improves the immune systems as well as help to maintain the blood acid-base balance (10).

The newly studies by author and his contributors (11,12) revealed that broiler chickens drinking water supplemented with vinegar improves feed efficiency during 1-10 days of age. No effects of drinker water supplemented with vinegar on relative weights of lymphoid organs, and meat yields found. Drinking water supplemented with vinegar significantly increased villus height (VH), crypt depth (CD) and decreased small intestine muscular thickness (MT) measured at 42 days of age. Another important finding of the present studied was the reduction in carcass abdominal fat content by drinking water supplementation of vinegar. Finally organic acid might be promising alternatives for to eliminate antibiotic in broiler chicken production.

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